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FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP 1100 SUPERIOR AVENUE, SEVENTH FLOOR CLEVELAND, OH 44114			EXAMINER MONDT, JOHANNES P	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/797,784

Applicant(s)

SETLUR ET AL.

Examiner

Johannes P. Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Amendment and Affidavit filed 10/03/2005 forms the basis for this office action. In said Amendment Applicant substantially amended previously presented claims 1-43 *inter alia* through substantial amendment of all independent claims 1, 14 and 27. Applicant included new claims 44 and 45.

The Affidavit filed on 10/03/2005 under 37 CFR 1.131 has been considered but is ineffective to overcome the Juestel et al and Srivastava et al references.

The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the Juestel et al and Srivastava et al references. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897). Said insufficiency must be concluded for the following reasons:

(A) Exhibit A is a form on which a date is clearly listed as pertinent data ("Docket Date"); however, no date has been entered under the appropriate heading, or, anywhere else in Exhibit A;

(B) No evidence is available from Exhibit A, even *arguendo* issues of date discussed above under (A), that the invention as claimed had been conceived, let alone actually reduced to practice, at a date relevant for the rejections made in the Office

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Action mailed 6/30/05 because at least the limitations “a semiconductor light source emitting radiation having a peak emission in the range of from about 250 nm to 450 nm” (claims 1 and 27 and dependent claims), “a UV light source emitting radiation having a peak emission at from about 250 nm to 450 nm” (claim 14 and dependent claims), appears to be absent from Exhibit A.

(C) No evidence is available from Exhibit A, even arguendo issues of date, that the invention as defined by claims 3, 16 and 29 (LED comprising a nitride compound semiconductor represented by the formula $\text{In}_i\text{Ga}_j\text{Al}_k\text{N}$), has been conceived, let alone reduced to practice, at a date relevant to overcome the rejections based on Juestel et al and based on Srivastava et al as provided in the Office Action mailed 6/30/05;

(D) No evidence is available from Exhibit A, even arguendo issues of date, that the invention as defined by claims 4, 17, and 30 (“light source is an organic emissive structure”), has been conceived, let alone reduced to practice, at a date relevant to overcome the rejections based on Juestel et al and based on Srivastava et al as provided in the Office Action mailed 6/30/05;

(E) No evidence is available from Exhibit A, even arguendo issues of date, that the invention as defined by claims 13, 26 and 39 (in particular: the full scope of the said “one or more additional phosphors” as listed in said claims), has been conceived, let alone actually reduced to practice, at a date relevant to overcome the rejections based on Juestel et al and the rejections based on Srivastava et al as provided in the Office Action mailed 6/30/05;

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(F) No evidence is available from Exhibit A, even arguendo issues of date, that the invention as defined by claims 11, 24 and 37 (in particular: the cited color point with cxx and ccy values quantified) has been conceived, let alone actually reduced to practice, at a date relevant to overcome the rejections based on Juestel et al and the rejections based on Srivastava et al as provided in the Office Action mailed 6/30/05.

Surprisingly, said Exhibit A is further characterized in said Declaration as having been "redacted". This by itself invalidates the evidence as supported by Exhibit A.

In light of the above, Exhibit A does nothing to support the Declaration under 37 C.F.R. 1.131 by the co-inventor of the application (Anant Achyut Setlur). Accordingly the Affidavit based on said Declaration must be considered ineffective to overcome the Juestel et al and Srivastava et al references, or any of the other references used in the rejections provided in the Office Action mailed 6/30/05.

Claim Objections

1. **Claim 44** is objected to because of the following informalities: the wording (Sr,Ba,Ca)₂SiO₄:Eu should be replaced by (Sr,Ba,Ca)₂SiO₄:Eu .

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. **Claims 1-45** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claims contain subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, Furthermore, the substantial amendments of all independent claims constitute new matter because the original specification does not disclose a "semiconductor light source emitting radiation having a peak emission in the range from about 250 nm to 450 nm" (claims 1 and 27 and dependent claims), nor does it disclose "a UV light source emitting radiation having a peak emission "at from" (sic) about 250 to 450 nm" (claim 27 and dependent claims).

2. **Claim 44** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim contains subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the claimed phosphor composition comprising all four of the phosphors as recited in claim 44 has not been disclosed in the specification.

3. **Claim 45** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

The claim contains subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, a

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semiconductor light source having a peak emission at about 405 nm has not been disclosed in the specification.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. ***Claims 1-3, 6, 7, 8, 12 and 13*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al (WO 03/080763 A1) in view of Sugawara et al (JP 11-261105).

Juestel et al teach a lighting apparatus for emitting white light (see Abstract) comprising: a semiconductor light source emitting radiation at a wavelength having a peak emission in a range that substantially overlaps with the range as claimed from about 250 nm to 450 nm (page 6, lines 6-13), namely the range from about 450 nm to about 480 nm; and a phosphor composition radiationally coupled to the semiconductor light source, the phosphor composition comprising $(\text{Ba}_{1-x-y-z}\text{Sr}_x\text{Ca}_y)_2\text{SiO}_4:\text{Eu}_z$ (see Abstract). Although the wavelength of the radiation emitted by the semiconductor light source is in the range claimed and hence a case of *prima facie* obviousness exists, it would additionally have been obvious to include the same InAlGa_N light-emitting layer as in the application rather than the InGa_N light-emitting layer by Juestel et al in view of Sugawara, who teach an LED with an InAlGa_N layer (thus meeting the further limitation of claim 3) for its wide spectral range and a durability superior to an InGa_N light-emitting

layer (see [0007]-[0010]). *Motivation* to include the teaching by Sugawara et al in the invention by Juestel et al at least immediately derives from the longer life span of the LED as taught by Sugawara et al (see [0007]-[0010]).

On claim 2: The light source by Juestel et al is an LED (see abstract).

On claim 6: the lighting apparatus by Juestel et al further comprises an encapsulant (resin 3: page 10, lines 8-15) surrounding the light source and the phosphor composition (Figure 2 and page 7, lines 19-22).

On claim 7: the phosphor composition is dispersed in the encapsulant (Figure 2 and page 7, lines 19-22).

On claim 8: the lighting apparatus by Juestel et al further comprises a reflector cup 2 (page 10, 8-15).

On claim 12: said phosphor composition by Juestel et al further comprises one or more additional phosphors, namely: any of the other phosphors listed in the group on page 4, lines 20-25, or the red phosphor selected from the group listed on page 7, lines 15-18.

On claim 13: said one or more additional phosphors are selected from the group consisting of the elements listed in this claim, as witnessed by the presence of $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_2\text{Si}_5\text{N}_8:\text{Eu}$, i.e., $(\text{Ba,Sr,Ca})_2\text{Si}_y\text{N}_z:\text{Eu}^{2+}$.

3. **Claims 14-16, 19-21 and 26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al in view of Sugawara et al (JP 11-261105), Shiiki et al (US 2003/0155856 A1) and Lowden et al (US 2002/0174794 A1).

Juestel et al teach a UV light source emitting radiation (any InGaN LED radiates in the UV range because the band gap only sets a lower limit to the frequency) (page 7, lines 19-20) and the peak wavelength of the emission is close to the UV range, while the range of UV (about 450 nm to about 480 nm) substantially overlaps with the claimed range (about 250 nm to about 450 nm), and hence at least *prima facie* obviousness can be concluded on the range of the primary light, while furthermore, it would have been obvious to include the same InAlGa_N light-emitting layer as in the application rather than the InGa_N light-emitting layer by Juestel et al in view of Sugawara, who teach an LED with an InAlGa_N layer (thus meeting the further limitation of claim 16) for its wide spectral range and a durability superior to an InGa_N light-emitting layer (see [0007]-[0010]). *Motivation* to include the teaching by Sugawara et al in the invention by Juestel et al at least immediately derives from the longer life span of the LED as taught by Sugawara et al (see [0007]-[0010]); the lighting apparatus by Juestel further comprises a phosphor composition radiationally coupled to the light source (see Abstract), the phosphor composition comprising (Ba,Sr,Ca)₂SiO₄:Ce (see Abstract), one or more garnet phosphor having the general formula: (Y,Gd,La,Lu,T,Pr,Sm)₃(Al,Ga,In)₅O₁₂:Ce, namely: Y_{1-x}Gd_xAl_{1-y}Ga_yO₁₂:Ce (page 7, lines 15-18). *Juestel et al do not necessarily teach* the inclusion magnesium fluorogermanate. *However, as evidenced by Shiiki et al, magnesium fluorogermanates have long been recognized* as additional red phosphors (see [0016]) in the art of light emitting diodes for producing white light, while as witnessed for instance by Lowden et al, the selection of the specific magnesium

fluorogermanate having the specific formula $\text{Mg}_4\text{FGeO}_6\text{:Mn}$ has long been used as red phosphor.

Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claim 15: the light source by Juestel et al is a semiconductor LED.

On claim 19: the lighting apparatus by Juestel et al further comprises an encapsulant (resin 3: page 10, lines 8-15) surrounding the light source and the phosphor composition (Figure 2 and page 7, lines 19-22).

On claim 20: the phosphor composition is dispersed in the encapsulant (Figure 2 and page 7, lines 19-22).

On claim 21: the lighting apparatus by Juestel et al further comprises a reflector cup 2 (page 10, 8-15).

On claim 26: said one or more additional phosphors are selected from the group consisting of the elements listed in this claim, as witnessed by the presence of $(\text{Sr}_{1-x-y}\text{Ba}_x\text{Ca}_y)_2\text{Si}_5\text{N}_8\text{:Eu}$, i.e., $(\text{Ba,Sr,Ca})_2\text{Si}_y\text{N}_z\text{:Eu}^{2+}$.

4. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al, Sugawara et al, Shiiki et al and Lowden as applied to claim 14 above, and further in view of Duggal et al (6,515,417 B1), or, in the alternative, further in view of Admitted Prior Art by Applicant. As detailed above, claim 14 is unpatentable over Juestel et al in

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view of Sugawara et al, Shiiki et al and Lowden, none necessarily teaching the further limitation defined by claim 17. However, it would have been obvious to include said further limitation in view of Duggal et al, who teach an organic light emitting diode emitting in the range claimed (col. 5, l. 25-47), or, in the alternative, in view of Applicants' admission of prior art of an organic light emitting diode (pages 5-6) suitable for the structure of the invention. *Motivation* to replace the semiconductor light-emitting source of Juestel et al by the organic light emitting diode by Duggal et al at least derives from the lower cost of organic light emitting diodes.

5. **Claims 1-3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al (6,621,211 B1) in view of Sugawara et al (JP 11-261105).

Srivastava et al teach a lighting apparatus for emitting white light comprising: a semiconductor light source having a peak emission in a range from 360 nm to 420 nm while Srivastava et al also teach a InGaN LED (thus meeting claim 2) emitting between 360 and 420 nm (col. 6, l. 10-12), said range substantially overlapping the range as claimed; a phosphor composition radiationally coupled to the light source (see Abstract), the phosphor composition comprising $(\text{Ba}, \text{Sr}, \text{Ca})_2 \text{SiO}_4:\text{Eu}$ (see Abstract). While the overlapping ranges for the primary emission of the light source constitute at least a case of *prima facie obviousness*, it would have been obvious to include the same InAlGaN light-emitting layer as in the application rather than the InGaN light-emitting layer by Srivastava et al in view of Sugawara, who teach an LED with an InAlGaN layer (thus meeting the further limitation of claim 3) for its wide spectral range and a durability superior to an InGaN light-emitting layer (see [0007]-[0010]). *Motivation* to include the

teaching by Sugawara et al in the invention by Juestel et al at least immediately derives from the longer life span of the LED as taught by Sugawara et al (see [0007]-[0010]).

Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

6. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al in view of Sugawara et al as applied to claim 1 above, and further in view of Duggal et al (6,515,417 B1), or, in the alternative, further in view of Admitted Prior Art by Applicant. As detailed above, claim 1 is unpatentable over Juestel et al in view of Sugawara et al, neither necessarily teaching the further limitation defined by claim 4. However, it would have been obvious to include said further limitation in view of Duggal et al, who teach an organic light emitting diode emitting in the range claimed (col. 5, l. 25-47), or, in the alternative, in view of Applicants' admission of prior art of an organic light emitting diode (pages 5-6) suitable for the structure of the invention. *Motivation* to replace the semiconductor light-emitting source of Juestel et al by the organic light emitting diode by Duggal et al at least derives from the lower cost of organic light emitting diodes.

7. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al and Sugawara et al as applied to claim 1 above, and further in view of Reeh et al (US 2001/0000622 A1). As detailed above, claim 1 is unpatentable over Juestel et al in view

of Sugawara et al, neither necessarily teaching the further limitation defined by claim 5. However, it would have been obvious to include said further limitation because, as shown by Reeh et al, the importance for the exact hue on uniform photon path length has long been recognized (see paragraph [090]), which is achieved inter alia by the embodiment of Figure 6 in Reeh et al, in which the phosphor composition is coated on the surface of the light source (see [0102]). *Motivation* to include the teaching by Reeh et al immediately flows from the aim by Juestel et al to improve the quality of color rendering.

8. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al and Sugawara et al as applied to claim 14 above, and further in view of Reeh et al (US 2001/0000622 A1). As detailed above, claim 14 is unpatentable over Juestel et al in view of Sugawara et al, Shiiki et al and Lowden et al, none necessarily teaching the further limitation defined by claim 18. However, it would have been obvious to include said further limitation because, as shown by Reeh et al, the importance for the exact hue on uniform photon path length has long been recognized (see paragraph [090]), which is achieved inter alia by the embodiment of Figure 6 in Reeh et al, in which the phosphor composition is coated on the surface of the light source (see [0102]). *Motivation* to include the teaching by Reeh et al immediately flows from the aim by Juestel et al to improve the quality of color rendering.

9. **Claims 27, 28, 38 and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al (6,621,211 B1) in view of Sugawara et al (JP 11-261105).

Srivastava et al teach a lighting apparatus for emitting white light comprising: a semiconductor light source having a peak emission in a range substantially overlapping with the range as claimed, namely from 360 and 420 nm (col. 6, l. 10-12); a phosphor composition radiationally coupled to the light source (see Abstract), the phosphor composition comprising $(\text{Ba}, \text{Sr}, \text{Ca})_2 \text{SiO}_4:\text{Eu}$ (see Abstract) and $(\text{Sr}, \text{Mg}, \text{Ca}, \text{Ba}, \text{Zn})_2 \text{P}_2\text{O}_7:\text{Eu}, \text{Mn}$ (see Abstract) as well as $(\text{Ca}, \text{Sr}, \text{Ba}, \text{Mg})_5(\text{PO}_4)_3\text{Cl}:\text{Eu}, \text{Mn}$ (see Abstract), thus meeting the claim limitation on phosphor composition. While the overlapping ranges for the primary emission of the light source constitute at least a case of *prima facie* obviousness, it would have been obvious to include the same InAlGa_N light-emitting layer as in the application rather than the InGa_N light-emitting layer by *Srivastava et al* in view of *Sugawara*, who teach an LED with an InAlGa_N layer (thus meeting the further limitation of claim 29) for its wide spectral range and a durability superior to an InGa_N light-emitting layer (see [0007]-[0010]). *Motivation* to include the teaching by *Sugawara et al* in the invention by *Juestel et al* at least immediately derives from the longer life span of the LED as taught by *Sugawara et al* (see [0007]-[0010]). Applicant is reminded that a *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art or when the ranges of a claimed composition do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties. In re Peterson, 65 USPQ2d 1379 (CA FC 2003).

On claims 38-39: said phosphor composition in the lighting apparatus by *Srivastava et al* further comprises one or more additional phosphors, in particular

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BaMgAl₁₀O₁₇:Eu²⁺ (BAM) which is a special case of the listed BaMgAl₁₀O₁₇:Eu, Mn ("BAM, BAMn").

10. **Claims 32-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al and Sugawara et al as applied to claim 27 above, and further in view of Juestel et al (WO 03/080763 A1). As detailed above, claim 27 is unpatentable over Srivastava et al in view of Sugawara et al, neither necessarily teaching the further limitations defined by claims 32-34. However, it would have been obvious to include said further limitations in view of Juestel et al, who teach the application to a blue/UV LED source encapsulated with a blend of phosphors by resin 3 (page 10), said resin 3 serving as encapsulant surrounding the light source and the phosphor composition (see Figure 1; thus meeting claim 32) said resin serving as an encapsulant within which the phosphors are dispersed (thus meeting claim 33), such that all primary light impinges on said phosphor blend while at the same time the resin provides protection for the LED source; while a reflector cup reflects back any light otherwise escaping from contributing to the interaction with the phosphor composition (thus meeting claim 34). Motivation to include the teaching by Juestel derives from the obvious advantage to apply the invention by Srivastava et al to an LED wherein the primary light source is protected while at the same time the primary light from the blue./UV LED source must travel through the phosphor by virtue of the LED being surrounded by the phosphor composition and reflectors further re-directing light back into the phosphor composition; thus improving the efficiency of the white light LED.

11. **Claim 30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Srivastava et al and Sugawara et al as applied to claim 27 above, and further in view of Duggal et al (6,515,417 B1), or, in the alternative, further in view of Admitted Prior Art by Applicant. As detailed above, claim 27 is unpatentable over Srivastava et al in view of Sugawara et al, neither necessarily teaching the further limitation defined by claim 30. However, it would have been obvious to include said further limitation in view of Duggal et al, who teach an organic light emitting diode emitting in the range claimed (col. 5, l. 25-47), or, in the alternative, in view of Applicants' admission of prior art of an organic light emitting diode (pages 5-6) suitable for the structure of the invention. *Motivation* to replace the semiconductor light-emitting source of Juestel et al by the organic light emitting diode by Duggal et al at least derives from the lower cost of organic light emitting diodes.

12. **Claim 31** is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirvastava et al and Sugawara et al as applied to claim 27 above, and further in view of Reeh et al (US 2001/0000622 A1). As detailed above, claim 27 is unpatentable over Srivastava et al in view of Sugawara et al, neither necessarily teaching the further limitation defined by claim 31. However, it would have been obvious to include said further limitation because, as shown by Reeh et al, the importance for the exact hue on uniform photon path length has long been recognized (see paragraph [090]), which is achieved inter alia by the embodiment of Figure 6 in Reeh et al, in which the phosphor composition is coated on the surface of the light source (see [0102]). *Motivation* to

include the teaching by Reeh et al immediately flows from the aim by Srivastava et al et al to improve the quality of color rendering.

13. **Claims 40 and 43** are rejected under 35 U.S.C. 103(a) as being unpatentable over Juestel et al (WO 03/080763 A1) in view of Emerson et al (US 2003/0209705 A1) and Nose et al (6,243,151). Juestel et al teach a phosphor blend including $(\text{Sr}, \text{Ba}, \text{Ca})_2\text{SiO}_4:\text{Eu}$ and $(\text{Y}_{1-x}\text{Gd}_x)_3(\text{Al}_{1-y}\text{Ga}_y)_5\text{O}_{12}:\text{Ce}$ (page 7, 13-18). Given the blue light-emitting source the above green and red phosphors are adequate and therefore Juestel et al has no need to teach the blue phosphor also included in claim 40. However, ultraviolet light-emitting devices have the advantage, as expressed by Emerson et al, that the blue component may otherwise be overrepresented (see paragraphs [0008] and [0009]). Therefore, it would have been obvious to replace the LED dominant in blue in Juestel et al (although also emitting in the UV spectrum) by a UV LED. Then, however, a third, blue, phosphor must be included in the blend so as to select and tailor the outcoming light. The list of phosphors as claimed includes well known blue phosphors in the art, such as the blue phosphor $\text{SrP}_2\text{O}_7:\text{Eu}$, which is a special case of $(\text{Sr}, \text{Mg}, \text{Ca}, \text{Ba}, \text{Zn})_2\text{P}_2\text{O}_7:\text{Eu}, \text{Mn}$, used by Nose et al (col. 9, l. 12-24, Figure 4). Motivation to include the teachings by Emerson et al and Nose et al in the invention by Juestel et al derives from the preventing of an overrepresentation of blue in the outcoming light and the creation of another parameter with which the composition of the outcoming light may be fine-tuned, namely; the relative abundance of the blue phosphor in the blend. With regard to *claim 43*: the existence green, red and blue phosphors in the blend enable the production of white light.

Response to Arguments

Applicant's arguments filed 10/03/2005 have been fully considered but they are not persuasive.

In particular, the Affidavit based on the Declaration under 37 C.F.R. 1.131 is ineffective for the reasons given above under "Response to Amendment" above.

Furthermore, the substantial amendments of all independent claims constitute new matter because the original specification does not disclose a "semiconductor light source emitting radiation having a peak emission in the range from about 250 nm to 450 nm" (claims 1 and 27 and dependent claims), nor does it disclose "a UV light source emitting radiation having a peak emission "at from" (sic) about 250 to 450 nm" (claim 27 and dependent claims). Accordingly, all claims are currently rejected under 35 U.S.C. 112, first paragraph on the basis of the introduction of new matter.

Apart from the issue of new matter discussed above, it is pointed out that the difference between the range for the peak emission as claimed (claims 1, 14 and 27 and dependent claims) is met by the range found in the prior art in the form of Juestel et al as cited because (see page 6, lines 8-11) the range of the emitted radiation from about 450 nm to about 480 nm necessarily has a peak emission within said range, which necessarily meets the limitation "about 450 nm", "about" meaning "approximately", while nothing in the specification further delineates "about" or "approximately" to bar interpretation of a margin of 30/450 or 7.5% as approximate; while the peak emission in Srivastava clearly is in a range that substantially overlaps with the range as claimed

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(claims 1, 14 and 27 and dependent claims). In this respect Applicant is respectfully reminded of the circumstance that, counter to Remarks pages 14-15 given a spectral range, designation of color is not a distinguishing feature at all, wavelength being in one-to-one correspondence with color.

Counter to Applicant's argument on page 15 that Juestel et al does not teach a UV light source because of the phrase "it has been found that color rendering can decrease at excitation energies below 450 nm" does not at all detract from the UV content of the light source taught by Juestel et al because the band gap in any semiconductor light emitting diode only prevents radiation emitted below a certain energy (band gap). The interpretation of "UV light source" as claimed according to the broadest possible interpretation simply means a light source that, among other radiation, emits UV radiation, which is met inherently because the band gap is only a lower limit to the wavelength, not an upper limit. What Juestel et al refers to as "UV" is to be put into quantitative context as radiation centered around a wavelength about 1.75 times shorter than the light of 450 nm (see page 6, lines 14-27). That the light emitting diode by Juestel et al is significantly shifted to the blue part of the spectrum is another matter that needs far better quantification to have any patentable content than is provided either in the specification or the claimed subject matter.

In light of the comments (pages 13-14) in traverse of the rejection under 35 USC 112,m second paragraph, said rejection is herewith withdrawn through the only interpretation listed in Merriam-Webster's Collegiate Dictionary, tenth edition, compatible with the combination "at from" to indicate a range, namely "at" in the sense

of “near”, which, however, further reinforces the evidently non-committal nature of the ranges as claimed.

On the remarks in traverse of the rejection under 35 USC 112, first paragraph (page 13) suffice it to say that the claim language has been corrected for clear mistakes despite the obvious mistake in the Remarks on page 13 that once again equates $(\text{Sr,Ba,Ca})_2\text{SiO}_4\text{:Eu}$ to $\text{Sr}_{1-x-y-z}\text{Ba}_x\text{Ca}_y\text{Eu}_z$ where $0 \leq x,y,z \leq 1$.

On the Remarks ad B on page 14, Applicant misrepresents the claimed range as “below 450 nm”. This is not what is claimed. Instead, Applicant, in newly amended claim 1 claims a range from about 250 to 450 nm, and accordingly the prior art still meets the claim limitation.

On the remarks ad C on page 14, Applicant appears to take the position that a peak emission wavelength of approximately 450 nm bars a semiconductor light-emitting element to be a UV emitting light emitting element. However, Applicant’s own claim language is enough to see the contradiction in this point of view: said UV light source as claimed (claim 14) has a peak emission that can well be about 450 nm, hence, for instance be 450 nm. Once again, the spectral range, not the color designation needs to be employed for numerical range limitations. As to the argument in traverse of the rejection over Juestel (Remarks under C on page 15): said argument misrepresents Juestel et al: please note that the semiconductor LED in one embodiment in Juestel et al “emits radiation at a wavelength from about 450 nm to about 480 nm, which clearly admits values below 450 nm.

On the Remarks under D through F on pages 15-16, no specific traverse can be found other than a traverse reliant upon the traverse of the rejections of the claims on which claims 4, 5, 17 and 18 depend.

On the Remarks under G (page 16-17) Applicant is referred to the "Response to Amendment" included above, in which the affidavit based on the Declaration including Exhibit A is found to be ineffective to overcome the art rejections based on Srivastava et al.

Counter to Remarks under H Juestel et al teaches a broader range than alleged here: see Juestel et al, pages 8-10.

In light of the above, art rejections must again be included also in the present Office Action.

Finally, Applicant seems to have included new claims 44 and 45, although the Remarks do not mention this circumstance and one portion of the claim language of claim 44 appears underscored. This underscore needs to be removed. Examiner has not found any disclosure in the specification of the claimed subject matter of claims 44 and 45, and hence the introduction of these new claims further constitutes the introduction of new matter.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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December 16, 2005



JACK KEITH
SUPERVISORY PATENT EXAMINER